Space Weather Forecast

Issued on Monday 30 September 2024 at 13:13 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class flares. Chance of G1-G2/Minor-Moderate Geomagnetic storms day 2.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity is Moderate with a Moderate-class flare observed from a complex sunspot region in the southeast of the Earth-facing disc.

There are currently nine sunspot regions on the visible disc. The most notable remains the aforementioned spot in the southeast quadrant, which continues to show minor growth in its intermediate spots and significant magnetic complexity. Two spots in the southwest, have shown a slight decaying trend. Two spots in the east, are both exhibiting minor but continued growth. Two new regions, along with all other regions are small and simple at present.

No further Earth-directed coronal mass ejections have been observed in available imagery.

Solar Wind / Geomagnetic Activity: Solar wind parameters were indicative of a weak coronal hole fast wind. Speeds started at background, rising to a peak of strong, by 30/0300 UTC. Interplanetary Magnetic Field was moderate, and briefly strong, with a peak at 29/1450 UTC, ahead of coronal hole fast wind. The north-south component was mostly positive (northward) with one consistent period of moderately negative (southward) between 29/2230-30/0100 UTC. Geomagnetic activity was mostly Quiet to Unsettled (Kp1-3), with two Active (Kp4) intervals (29/1200-1500 & 30/0000-0300).

Energetic Particles / Solar Radiation: The count rate of energetic particles remained at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected, with a chance of further isolated Moderate class flares. There is a very slight chance of a Strong flare from the complex sunspot region located in the southeast.

Solar Wind / Geomagnetic Activity: A coronal mass ejection which left the Sun from the southwest quadrant on 29/0544 UTC has been reanalysed with possible glancing impacts at Earth any time from early day 2 (01 Oct) until early day 3 (02 Oct). Solar winds are likely to remain slightly

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elevated on day 1 (30 Sep) due to coronal hole fast wind influences, before returning to background levels on day 2 (01 Oct).

Mainly Quiet (Kp 0-2) geomagnetic conditions are expected initially, with a chance of Unsettled to Active (Kp 3-4) intervals due to the waning coronal hole fast wind environment. There is then a chance of G1-G2/Minor-Moderate geomagnetic storms occurring day 2 (01 Oct) due to the glancing arrival of the 29 Sep coronal mass ejection, this risk continuing but reducing into day 3 (02 Oct). Confidence becomes lower by day 4 (03 Oct) due to the number of filaments currently on the disc.

Energetic Particles / Solar Radiation: The count rate of energetic particles is forecast to persist at background levels, with no solar radiation storms expected.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	30	20	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	50	50	50	50
Very Active	R3-R5 (X Class)	No	10	10	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	15	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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